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Urban Planning in the Territory of Medieval Bolgar

Ayrat Sitdikov[1], Denis Badeev[2]

***Abstract**:*

The article presents the studies of the urban planning of medieval Bolgar on the Volga river which represented a leading urban centre in the period of Volga Bolgaria and the Golden Horde.

The dynamics of variations in the urban territory of Bolgar settlement in the period of its existence from 10th to 15th centuries were recreated on the basis of a stratigraphic scale of the settlement developed as a result of long-term archaeological work comprising the distribution of cultural layers, chrono-topography of the findings, spatial location of archaeological urban sites and the application of geographic information systems.

Data from over 200 excavations located in different parts of the Bolgar settlement were processed and analysed. At the same time, the area of the site explored by archaeological excavations does not exceed 2 % of the total area of Bolgar in the Golden Horde period.

The study included the generation of a series of cartograms, each of which corresponds to a certain stage of the town's development related to historical events which occurred both in the Volga-Kama region and the Eastern Europe.

In addition, the registration of various dwelling types (both buried and ground), industrial (metallurgical and pottery kilns), public (bathhouses and wells), trading (a marketplace) and religious (mosques and mausoleums) sites allows to reconstruct the dynamics of the social topography of Bolgar town.

***Keywords:** Archaeology, Volga Bolgaria, The Golden Horde, Medieval Town, Urban Planning.*

[1]*Institute of International Relations, History and Oriental Studies, Kazan Federal University, Russia, lilgalim@bk.ru*
[2]*Institute of International Relations, History and Oriental Studies, Kazan Federal University, Russia, denisbadeev@mail.ru*

1. Introduction

Bolgar settlement is a 10th-15th century archaeological site located in the Western Trans-Kama region in the territory of the Spassky District of the Tatarstan Republic (Russian Federation). This archaeological complex is traditionally associated with the historical town of Bolgar which represented one of the most significant towns of Volga Bolgaria in 10th - early 13th centuries: it was here where in 922 the Volga Bolgars adopted Islam as a national religion, and after the Mongol conquest of 1236 when Volga Bolgaria was included in the Ulus of Jochi, Bolgar acted as the administrative centre of the Bolgar ulus of the Golden Horde and was involved in the ongoing domestic political events (Sitdikov and Izmailov, 2015).

Of importance for the dynamic pattern of medieval Bolgar is the topography and landscape in which its foundation and development occurred. The town was located on a cape, formed by the edge of a high (approximately 30 m) upland fringe at the north and a deep gulley at the east and south-east, which was later became known as Great Jerusalem gulley. The altitude difference of the upland fringe does not exceed 5 m. Besides, the fringe accommodated a significant number of seasonal reservoirs and channels.

Based on long-term archaeological research materials, A.P. Smirnov developed a stratigraphic scale of Bolgar settlement allowing to associate any of its districts to a certain period of the town's history. It comprises a total of 7 layers associated with certain historical stages of the Volga region and Eastern Europe as a whole: layer 1-2 - the layer of contemporary and Russian villages (17th- 20th centuries), layer 3 - the layer of Kazan Khanate (second half of 15th - 16th centuries), layer 4 - the Golden Horde period (mid-13th - first half of 15th centuries), layers 5-6 - pre-Mongol period (10th - first half of 13th centuries).

The first information on the dynamics of urban development and its social topography based on stratum distribution was presented in the 1970-1980s in the works by Smirnov (1974) and Khlebnikova (1987). Archaeological excavations conducted at Bolgar settlement in 2010-2015 provided new materials for the assessment of the development dynamics of the medieval town.

The research covered both central and peripheral districts of the settlement, particularly located in the southern section of the site, which until recently remained understudied, and additional studies were conducted at defensive fortifications. The purpose of this research is to demonstrate the dynamics of changes in Bolgar territory during the medieval period with the use of the developed stratigraphic scale of Bolgar settlement, new results of recent archaeological works, and geographical information system (GIS) modelling and mapping techniques.

Another relevant issue is related to the inclusion of information on the town-planning tradition of Volga Bolgaria into the system of the town-planning tradition

of the Islamic medieval world. Until now the general studies of the Islamic urban culture have been conducted based on materials from Central Asian, Middle Asian and Middle Eastern urban centres (Sayyad, 1991; Benco, 2004; Jayyusi *et al.*, 2008) except for the northern regions of the spread of Islam.

2. Methodology

The information obtained during archaeological research over the entire period of Bolgar studies (265 excavations) was included in the historical and cultural geoinformation system of Bolgar settlement developed by the specialists of Kazan (Volga Region) Federal University based on ArcGIS 10 software (Chernova *et al.*, 2012). The application of the GIS technology in the studies of medieval towns allows to analyse the layout of a site, as well as its structure and development dynamics, ruling out research subjectivity. The application of GIS methods is currently widely used in the archaeological research of carious regions, periods and cultures. The number of archaeological studies conducted with the use of geoinformation methods is steadily growing, which is indicated by the appearance of teaching aids (Conolly and Lake, 2006; Korobov, 2011). A slightly modified technique originally developed for studying the dynamics of medieval Novgorod (Petrov and Tarabardin, 2012; Petrov, 2015) was selected as a basis.

The Bolgar settlement GIS project consists of 5 topical units: 1) geographic ('relief', 'hydrography', 'contemporary objects' and 'roads' layers, and an additionally created digital relief model required for a more accurate and complete representation of the surface and horizontal structure of the settlement site, 2) historical – period plans and maps of Bolgar settlement of 18th - early 20th centuries compiled on the basis of several reference points (surviving monumental structures, rampart curves and reservoirs); 3) remote sensing data (aerial photography); 4) archival (report materials and publications); 5) archaeological. The archaeological unit comprises the following layers: excavations (including the available stratigraphic layers), monumental structures, elements of urban planning (streets, squares, etc.), remains of ground and buried residential and household buildings, fortification structures, production and agricultural facilities (kilns and the remains of arable lands), burial grounds, hydraulic structures, and the chrono-topography of findings.

Each excavation was considered by the authors as an individual site, the information on which was subdivided into two blocks: the first block represented a brief registration certificate (excavation number, year of works, head of excavation, total thickness of the cultural layer), and the second block consisted of stratigraphy information (availability or absence of strata on the stratigraphic scale of Bolgar settlement), archaeological sites and chronological findings. Cartograms for the

planigraphic distribution of layers, sites, elements of urban planning and chronological indicators were compiled based on data from the archaeological block.

The Dirichlet method (Thyssen polygons) was applied during the compilation of cartograms in Arcview 10 GIS software with a spatial analytics module, according to which in a certain area the distance from any point within the site (excavation or finding) is less that the distance to any other of numerous sites. A line of ramparts erected not earlier than the 1340s was selected as a border of the model. The northern boundary of the model was plotted along the line of northern excavations in the settlement beyond the river, for since late 1950s the territory has been flooded by Kuibyshev reservoir, and there is no information on the spread of the cultural layer or defensive structures previously located in this part of the Bolgar settlement.

3. Results

A total of 20 cartograms were compiled, which are associated with 5 different periods in the development history of the town. Cartogram (layer) matching has provided the following results of research on the development dynamics of the medieval Bolgar territory. In the pre-Mongol period the town existed in the form of an agricultural and industrial agglomeration with an administrative centre within the urban fortifications (with an area of approximately 82,000 square metres), whereas the developed area included both the territories adjacent to the fortifications at the west, where the area of continuous distribution of layer 6 reaches 38,000 square metres, and the regions located at a considerable distance (by the Small and Great Jerusalem gulleys, to the west and south-east of the fortified cape area).

Thus, the area of the town including its unfortified suburbs exceeded 120,000 square metres. By 1236 the area of the fortified portion of the town reached 284,500 square metres, and the piedmont and trans-river began to be developed, where blacksmith and pottery workshops appeared. A handicraft district associated with ferrous metallurgy was established in the south-western portion of the town. At the same time, every time the town's area increased, the production of flammable materials was transferred further to its south-western periphery.

The capture of Bolgar by the Mongols did not significantly affect the growth rate of its territory. In many aspects, this can be attributed to the fact that it was Bolgar which represented an administrative centre after a complete desolation of the former capital of Volga Bolgaria – the town of Bilyar. The town not only preserved its area, but by the end of 13th century accommodated the first monumental structures located both in the central portion of the town and on the outskirts. By the early 14th century the status of urban estates located to the west and south-west of the cathedral mosque had changed (Badeev, 2015), the handicraft district formerly located in this area was transferred further to the south-west towards the Gollankino, the nature of residential development in south-eastern portion of the town behind the Great

Jerusalem gulley had changed (sites with channel type heating systems appeared) and the density of urban development had increased. The active development of this territory can be associated with the arrival of new population introducing new construction elements – an active use of sun-dried brick and underfloor heating in in house-building practice.

In the first half of the 14th century the city reached its maximum size, and the street network connecting various parts of the town actively developed. By the middle of the 14th century the growth of urban territory decreased. It was limited to the outer defensive structures which have survived until the present day. The erection of these defensive structures can be attributed to 1340-1350s, which is indicated by the discovered copper coins dating back to the period of Uzbek Khan's reign in the embankment of the rampart and the absence of traces of fire underneath, which has been recorded on a large portion of Bolgar settlement and is commonly associated with the capture of the town by the Horde prince Bulak Timur in 136 (Zhyromsky, 1958).

The termination of the growth of the urban territory can be associated with a series of events: from a plague that swept across Europe, when, first of all, large urban centers with a high population density suffered, according to Schamiloglu, a “black death” could penetrate Bolgar by 1349 with diseases of the southern regions of the Golden Horde (Schamiloglu, 1993), before the feudal war that developed in the 60s inside the Golden Horde state, which is referred to in Russian chronicles as "zamyatnya."

In the early 1360s there was a noticeable reduction in residential development, which approached the boundaries of the pre-Mongol settlement in the early 13th century. It were the peripheral areas of the southern section of the settlement which demonstrated the most dynamic pattern of changes in the nature of urban development: after their initial development in late 13th century they were almost completely excluded from residential and utility use by mid-14th century, and individual large manors were replaced by extensive burial grounds. By early 15th century (layer 3) the rare buildings and remains of the cultural layer associated with the Kazan Khanate period concentrated around the Cathedral Mosque, and individual coin findings were recorded south-east and south-west of the site.

4. Discussion

The obtained results demonstrate the possibilities of using geoinformation system techniques at sites with well-stratified cultural layers. At the same time, a detailed pattern of the dynamics of changes in the urban area of medieval Bolgar requires a more fractional classification of layers identified during archaeological research. Thus, layer 4 of Bolgar settlement corresponding to the late Golden Horde period features a wide time frame (second decade of 14th – early 15th centuries) which

includes the opposing vectors of its development. The work revealed the need to identify the upper horizon of the late Golden Horde layer 4 of Bolgar settlement. Its lower boundary may be represented by a layer of fire associated in written sources with the capture of the Bulak town by Timur in 1361, and the upper boundary - with the early 15th century when Bolgar apparently lost its functions of an administrative centre, and its territory significantly reduced. The data obtained during the study were presented at the 7th International Conference dedicated to the memory of G.A. Fedorov-Davydov "Dialogue of Urban and Steppe Cultures on Eurasian Territory. Historical Geography of the Golden Horde" (Russia, Yalta, 2016), where they were positively received by the participating specialists (Badeev, 2016).

5. Summary

The application of geoinformation system techniques has allowed to determine the dynamics of changes in the urban territory with sufficient accuracy. In many aspects, Bolgar represents a typical model of the development of a medieval town. The significant factors in the establishment and development of the urban territory at the initial stage are a combination of the landscape and geographical location (roughness and heterogeneity of the terrain) and its socio-economic and political functions. An important factor of the urban space formation structure during Bolgar's existence was the religious component.

6. Conclusions

Further research into the dynamics of changes in Bolgar's urban territory may be associated with the inclusion of comprehensive research results in the field of natural scientific studies actively conducted at Bolgar settlement over the last decades in a database. The application of geoinformation system methods for the reconstruction of the historical landscape of the medieval Bolgar appears promising.

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